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Translation of Priority Document

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COMMISSIONER

[ABSTRACT OF THE DISCLOSURE]

[ABSTRACT]

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A method for transmitting short messages to a plurality of called subscribers in a GSM system. Upon detecting selection of a short message service menu, a GSM terminal transmits short message information including a group identifier and a short message. A short message service center detects
10 the group identifier from the short message information, reads called subscriber numbers corresponding to the group identifier from its memory, and simultaneously transmits the short message to the called subscriber numbers.

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[SPECIFICATION]

[TITLE OF THE INVENTION]

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**METHOD FOR TRANSMITTING SHOHRT MESSAGE
TO CALLED SUBSCRIBERS**

[BRIEF DESCRIPTION OF THE DRAWINGS]

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FIG. 1 is a block diagram of a general GSM system;

FIG. 2 is a block diagram of a general GSM terminal;

FIGs. 3A and 3B are flow charts showing a short message transmitting
procedure by a GSM terminal in a GSM system according to the present
invention;

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FIG. 4 is a flow chart showing a short message group registration mode
routine indicated in FIG. 3A;

Fig. 5 is a flow chart showing a short message transmitting procedure by a
short message service center in a GSM system according to the present
invention;

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FIG. 6 is a flow chart showing a short message group registration mode
routine shown in FIG. 5; and

FIG. 7 is a block diagram of a general short message service center.

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**[DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT]
[OBJECT OF THE INVENTION]
[RELATED FIELD AND PRIOR ART OF THE INVENTION]**

The present invention relates to a method for transmitting short messages
in a GSM (Global System for Mobile Communication) system, and more
particularly, to a method for simultaneously transmitting a short message to a
plurality of GSM subscribers.

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In a GSM system which is an European cellular mobile telephone system, traffic and signaling information is transmitted as a digital signal of TDMA (Time Division Multiple Access). The signaling and traffic information has a burst form of 156.25 bits between a base transceiver station and a GSM terminal. Generally, a burst of a traffic channel includes 3 start bits, 58 message bits, 26 trailing sequence bits, 58 new message bits, and 3 stop bits. A guard space exists between successive bursts to distinguish between them. Therefore, the total length of a burst is 156.26 bits and the time thereof is 0.577 ms. Bursts of other channels have 8 frames respectively and are sequentially positioned on a radio channel frequency. These bursts include digital compressed traffic information, voice information and character information.

FIG. 1 illustrates a general GSM system for transmitting short messages.

Referring to FIG. 1, a home location register (HLR) 160 has data about mobile subscribers. The HLR 160 includes data such as a home location of a subscriber and an address of a service center which has stored a short message for a GSM terminal. The address of the service center is deleted after the short message is transmitted. A visitor location register (VLR) 150 includes data such as an actual or latest known location of a subscriber, an ON/OFF state of a GSM terminal and a secret number. A mobile switching center (MSC) 100 is connected to another MSC, a public switched telephone network (PSTN), an integrated services digital network (ISDN), and a short message service center. A first base station subsystem (BSS) 110 is comprised of a base station controller (BSC) 112 and a plurality of base transceiver stations (BTSs) 114 and 116. A second base station subsystem (BSS) 120 is comprised of a base station controller (BSC) 122 and a plurality of base transceiver stations (BTSs) 124 and 126. The BSCs 112 and 122 are connected to the MSC 100 and to at least one BTS. The BTS controls a message between GSM terminals and the MSC 100

and forms a radio link to transmit voice and data. A subscriber authenticator 140 confirms an authentication number or a secret number in order to prevent any mobile subscriber from fraudulently using other's identification. A short message service center 180 stores short messages and stores a group identifier and a plurality of addresses corresponding to the group identifier. Called subscriber numbers are stored in these addresses. If a short message can not be transmitted to the called subscriber number, that is, if the called subscriber is in a busy state or does not answer a call, the short message service center 180 repeatedly attempts to transmit the short message by a preset number of times. Short message service gateways 170 and 190 connect the MSC to the short message service center 180.

FIG. 2 is a block diagram of a general GSM terminal. Referring to FIG. 2, a controller 1 controls the overall operations of the GSM terminal. For example, the controller 1 causes the GSM terminal to make short message group registration information for transmitting a short message in a short message group transmission mode. A memory 2 stores programs for short message group transmission and stores data generated during the execution of those programs. A key entry unit 3 has a plurality of numeral keys and function keys and generates key data. A display unit 4 displays the key data generated from the key entry unit 3, and displays the operation status of the GSM terminal. An audio circuit 6 converts an audio signal received through a mike MIC or data received from the controller 1 into an intermediate frequency signal. Further, the audio circuit 6 receives an intermediate frequency signal, and supplies processed data or audio signal to the controller 1 or a speaker SP, respectively. A radio frequency (RF) circuit 5 demodulates an RF signal received through an antenna AT into an intermediate frequency signal. Moreover, the RF circuit 5 modulates the intermediate frequency signal received from the audio circuit 6 into the RF signal and transmits the RF signal through the antenna AT.

In the operation of a conventional short message transmitting service, if a menu key on the key entry unit 3 of a GSM terminal 10 is selected, the controller 1 causes the display unit 4 to display menus. If a short message service menu is selected among the displayed menus, the controller 1 instructs a calling subscriber to sequentially input a short message service center number, a short message, and a destination address (that is, a called subscriber). In this case, only one destination address is input. If the short message service center number, short message and destination address are input, the controller 1 checks if a transmit key is selected. If the transmit key is selected, the controller 1 transmits short message information including the service center number, short message and destination address with a prescribed burst format through the RF circuit 5.

The BTS 114 received the short message information from the GSM terminal 10 and transmits the information to the BSC 112. The BSC 112 transmits the short message information to the MSC 100. The MSC 100 detects the called subscriber number from the short message information and checks if the called subscriber number is a registered subscriber number. If so, the MSC 100 detects the service center number (that is, service center address) from the short message information and is switched to the short message service center 180. The service center address is temporarily stored in the HLR 160. The short message information is matched through the short message service gateway 170 and transmitted to the short message service center 180. The short message service center 180 stores the short message information and detects the destination address. The short message service center 180 transmits the short message to the destination address by controlling the MSC 100. If the destination address is a GSM terminal 40, the short message service center 180 transmits the short message to the GSM terminal 40. However, if the GSM

terminal 40 is a busy state or does not answer a call, the short message service center 180 repeatedly attempts to transmit the short message by a preset number of times.

5 Thus, the short message is transmitted to a destination terminal by point-to-point links. Even if it is desired to transmit the same short message to plural terminals, the short message is transmitted to those terminals one by one.

10 **[SUBSTANTIAL MATTER OF THE INVENTION]**

It is therefore an object of the present invention to provide a method for transmitting a short message to a plurality of GSM subscribers.

15 To achieve the object of the present invention, there is provided a method for transmitting a short message to a plurality of called subscribers in a GSM system, including the steps of: causing a GSM terminal to transmit short message information including a group identifier and a short message upon detecting selection of a short message service menu; and causing a short message service center to detect the group identifier from the short message information, to read
20 called subscriber numbers corresponding to the group identifier from its memory, and to simultaneously transmit the short message to the called subscriber numbers.

25 **[CONSTRUCTION AND OPERATION OF THE INVENTION]**

In the following description, numerous specific details are set forth to provide a more thorough understanding of the present invention. It will be apparent, however, to one skilled in the art that the present invention may be practiced without these specific details. In other instances, well known
30 functions or constructions have not been described so as not to obscure the subject matter of the present invention.

FIGs. 3A and 3B are flow charts showing a short message transmitting procedure by a GSM terminal in a GSM system according to the present invention.

5 The controller 1 determines if a menu key on the key entry unit 4 is selected at step 300. If it is selected, the controller 1 causes the display unit 3 to display menus, such as a short message service menu and a secret number change menu, at step 302. It is checked at step 303 whether the short message service menu is selected among the displayed menus. If the short message
10 service menu is selected, the controller 1 causes the display unit 3 to display sub menus, such as a short message transmission mode and a short message group registration mode. If the short message transmission mode is selected among the displayed sub menus at step 304, the controller 1 causes the display unit 3 to instruct a calling subscriber to input a service center address which is a short
15 message service center number at step 305. Meanwhile, if the short message group registration mode is selected among the displayed sub menus at step 317, the controller 1 performs a short message group registration mode routine at step 318. It is checked at step 306 whether the short message service center address is input. If the short message service center address is input, it is stored in the
20 memory 2 at step 307. The controller 1 causes the display unit 3 to display a group transmission mode and a normal mode so as to select one of two. If the group transmission mode is selected at step 308, the calling subscriber is instructed to input a group identifier to which a short message is transmitted at step 309. If the group transmission mode is not selected, that is, if the normal
25 mode is selected at step 308, the controller 1 executes a normal short message mode at step 319. The controller 1 checks if the group identifier is input at step 310. The calling subscriber is instructed to input a short message at step 312. It is checked at step 313 whether a short message end key is selected. If so, the short message is stored in the memory 2 at step 314. The controller 1 checks if
30 a transmit key is selected at step 316. If it is selected, the controller 1 transmits through the RF circuit 5 short message information including the stored short message service center address, group identifier and short message with a normal burst format through the RF circuit 5. The RF circuit 5 modulates the short message information into a radio signal by the control of the controller 1 and
35 transmits the modulated radio signal through the antenna.

FIG. 4 illustrates the short message group registration mode routine shown in FIG. 3A. If the short message group registration mode is selected among the displayed sub menus at step 317 shown in FIG. 3A, the controller 1
40 enters the short message group registration mode routine. The controller 1 instructs the calling subscriber to input a short message service center address at step 401. It is checked at step 402 whether the service center address is input.

If the service center address is input, it is stored in the memory 2 at step 403. The calling subscriber is instructed to input a group identifier at step 404. The controller 1 checks if the group identifier is input at step 405. If the group identifier is input, it is stored in the memory 2 at step 406. The calling
5 subscriber is instructed to input a destination address which is a called subscriber number at step 407. It is checked at step 408 whether the destination address is input. If the destination address is input, it is stored in the memory at step 409. The controller 1 checks if a destination address end key is selected at step 410. If it is not selected, the controller 1 proceeds back to step 407 to group a plurality
10 of destination addresses. Namely, a plurality of called subscribers is grouped. If the destination address end key is selected, the controller 1 transmits short message group registration information with a burst format through the RF circuit 5. The RF circuit 5 modulates the short message group registration information into a radio signal.

The radio signal including the short message information or the short message group registration information transmitted from the GSM terminal 10 is sent to the BTS 114. The BTS 114 demodulates the radio signal into a short message signal. The short message signal is transmitted to the MSC 100
20 through the BSC 112. The MSC 100 transmits the short message signal to the subscriber authenticator 140. The subscriber authenticator 140 detects a GSM terminal number and judges whether the detected GSM terminal number is a registered number by retrieving GSM terminal numbers stored in the HLR 160. If the GSM terminal is authenticated as a registered terminal through the subscriber authenticator 140, the MSC 100 is switched to a service center
25 address detector 130 to detect the service center address. The MSC 100 receives the detected service center address and is switched to a corresponding service center. Moreover, the MSC 100 matches the short message through the short message service gateway 170 and transmits the short message to the short message service center 180.
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FIG. 7 shows a schematic block diagram of the short message service center. A gateway circuit 740 detects the short message information or the short message group registration information from the short message signal
35 received from gateways, and interfaces input/output signals. A group identifier detector 750 detects a group identifier from the short message information or short message group registration information detected from the gateway circuit 740, and transmits the detected group identifier to a controller 710. A short message detector 760 detects a short message from the short message information or the short message group registration information. A subscriber
40 number detector 770 detects called subscriber numbers corresponding to the group identifier. A tone generator 730 generates a tone signal and transmits the

tone signal to the gateway circuit 740. A memory 720 stores an operation program for operating the short message service center and stores a short message for a prescribed time. The controller 710 controls the overall operation of the short message service center and causes the group identifier
 5 detector 750 to detect the group identifier. The controller 710 also causes the tone generator 730 to transmit the tone signal to a called subscriber number contained in the detected group identifier.

FIG. 5 illustrates a short message transmitting procedure by the short
 10 message service center. Referring to FIG. 5, the controller 710 of the short message service center checks whether the short message signal is received from the gateway circuit 540 at step 501. Upon receiving the short message signal, the controller 710 checks if the short message signal includes the short message information or short message group registration information at step 502. If it
 15 includes the short message information, it is checked at step 503 whether the short message information is a group transmission mode. Meanwhile, if the short message signal includes the short message group registration information, the controller 710 proceeds to step 510 to execute a short message group registration mode routine. If the short message information is a group
 20 transmission mode at step 503, the controller 710 causes the short message detector 760 to detect the short message and causes the memory 720 to store the detected short message at step 504. If the short message information is not a group transmission mode, the controller 710 proceeds to step 511 to execute a normal short message mode. The controller 1 causes the group identifier
 25 detector 750 to detect the group identifier from the short message information at step 505. It is checked at step 506 whether the detected group identifier exists in the memory 720. Upon detection the group identifier in the memory 720, the controller 710 reads called subscriber numbers pf a corresponding group from the memory 720 at step 507. If the detected group identifier does not exist in
 30 the memory 720, the controller 710 transmits a group registration error signal to the GSM terminal at step 512. After the called subscriber numbers are read, the controller 510 causes the tone generator 730 to transmit the tone signal to the called subscriber numbers through the gateway 750 at step 509. For example, GSM terminals 20, 30 and 40 have the subscriber numbers of the group identifier,
 35 the short message is transmitted to those terminals, 20, 30 and 40.

FIG. 6 illustrates the short message group registration mode routine shown in FIG. 5. Referring to FIG. 6, the controller 710 checks it the short message signal received from the gateway circuit 740 includes the short message
 40 group registration information at step 601. If so, the controller 710 causes the group identifier detector 750 to detect the group identifier and causes the subscriber number detector 770 to detect the called subscriber numbers at step

602. The controller 710 stores the called subscriber numbers in address corresponding to the detected group identifier at step 603.

[EFFECT OF THE INVENTION]

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As described above, the short message can be simultaneously transmitted to a plurality of called subscribers without repeatedly transmitting the same short message, thereby reducing the waste of time.

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[PATENT CLAIM(S)]

1. A method for transmitting a short message to a plurality of called subscribers in a GSM (Global System for Mobile Communication) system, said method comprising the steps of:
- 5 registering a plurality of called subscriber numbers to which a short message is to be transmitted in a short message service center, together with a group identifier; and
- 10 simultaneously transmitting the short message to said called subscriber numbers by designating said group identifier.
2. A method for transmitting a short message to a plurality of called subscribers in a GSM (Global System for Mobile Communication) system
- 15 having a base station subsystem for demodulating an input signal, and a mobile switching center for detecting a short message service center number and switching a corresponding short message service center through a gateway, said short message service center having a memory for storing a group identifier and a plurality of called subscriber numbers, said method comprising the steps of:
- 20 (a) causing a GSM terminal to transmit short message information including a group identifier and a short message upon detecting selection of a short message service menu; and
- (b) causing said short message service center to detect the group identifier from the short message information, to read called subscriber numbers
- 25 corresponding to the group identifier from said memory, and to simultaneously transmit the short message to the called subscriber numbers.
3. The method as claimed in claim 2, wherein said step (a) comprises the steps of:
- 30 displaying menus in response to an input of a menu key, and checking if a short message service menu is selected among said menus;
- if said short message service menu is selected, displaying sub menus of a short message transmission mode and a short message group registration mode;
- if said short message transmission mode is selected, instructing a calling
- 35 subscriber to input a short message service center number, and storing the short message service center number;
- displaying sub menus of a group transmission mode and a normal transmission mode;
- if said group transmission mode is selected, instructing the calling
- 40 subscriber to input a group identifier, and storing the group identifier in said memory;

instructing the calling subscribers to input a short message, checking if a short message end signal is input, and storing the short message in said memory; and

5 checking if a transmit key is input, and transmitting a short message signal including the stored short message service center number, group identifier and short message in response to an input of said transmit key.

4. A method as claimed in claim 2, wherein said step (b) comprises the steps of:

10 checking if the short message signal is received;

if the short message signal is received, checking the short message signal includes short message information or short message group registration information;

15 if the short message signal includes the short message information, checking if the short message information is a group transmission mode or a normal short message mode;

20 if the short message information is a group transmission mode, detecting a short message from the short message information, storing the detected short message in said memory, and detecting a group identifier from the short message information;

checking if the detected group identifier exists in said memory, and if the detected group identifier exists in said memory, reading called subscriber numbers corresponding to the detected group identifier from said memory; and

25 dialing the called subscriber numbers read from said memory to transmit the short message thereto.

5. A method for transmitting a short message to a plurality of called subscribers in a GSM (Global System for Mobile Communication) system, said method comprising the steps of:

30 (a') causing a GSM terminal to transmit a short message registration signal including a short message service center number, a group identifier and at least one called subscriber number; and

35 (b') causing a short message service center to receive said short message registration signal, to detect the group identifier from said short message registration signal, to store the detected group identifier, to assign addresses corresponding to the number of called subscriber numbers, and to store called subscriber numbers in the assigned addressed.

40 6. The method as claimed in claim 5, wherein said step (a') comprises the steps of:

displaying menus in response to an input of a menu key, and checking if a short message service menu is selected among said menus;

if said short message service menu is selected, displaying sub menus of a short message transmission mode and a short message group registration mode;

5 if said short message group registration mode is selected, instructing a calling subscriber to input a short message service center number, and storing the short message service center number;

instructing the calling subscriber to input a group identifier, and storing the group identifier in said memory;

10 instructing the calling subscriber to input a called subscriber number, and storing the called subscriber number in said memory;

checking if a called subscriber number end signal is input, checking if a transmit key is input upon detecting an input of the called subscriber number end signal, and if no called subscriber number end signal is detected, returning to said step of instructing the called subscriber to input a called subscriber number; and

15 if the transmit key is input, and transmitting a short message signal including the short message service center number, group identifier and called subscriber numbers.

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7. A method as claimed in claim 5, wherein said step (b') comprises the steps of:

checking if the short message signal is received;

25 if the short message signal is received, checking the short message signal includes short message information or short message group registration information; and

30 if the short message signal includes the short message group registration information, detecting a group identifier from the short message group registration information, assigning addresses corresponding to the detected group identifier, and storing called subscriber numbers in the assigned addresses.

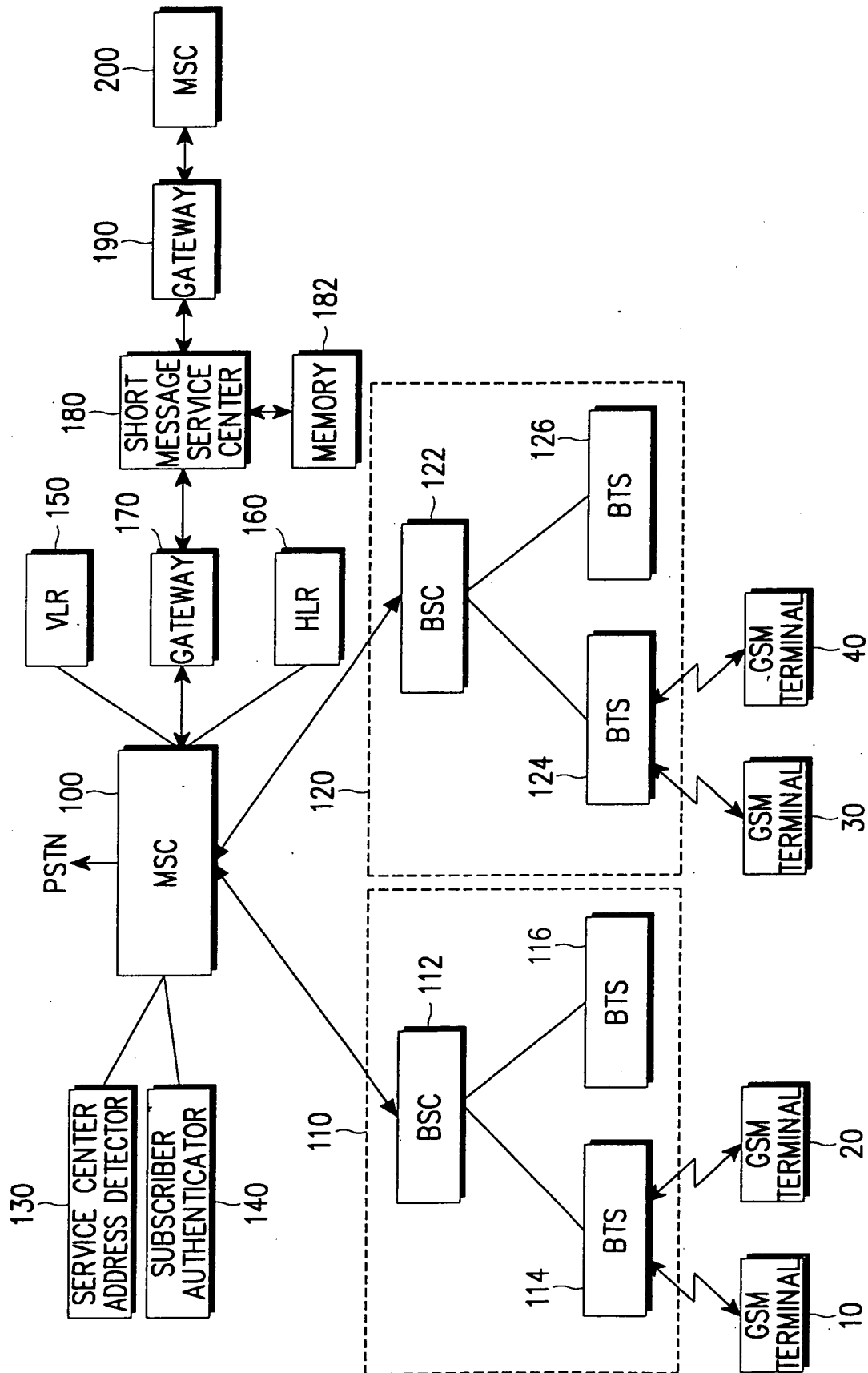


FIG. 1

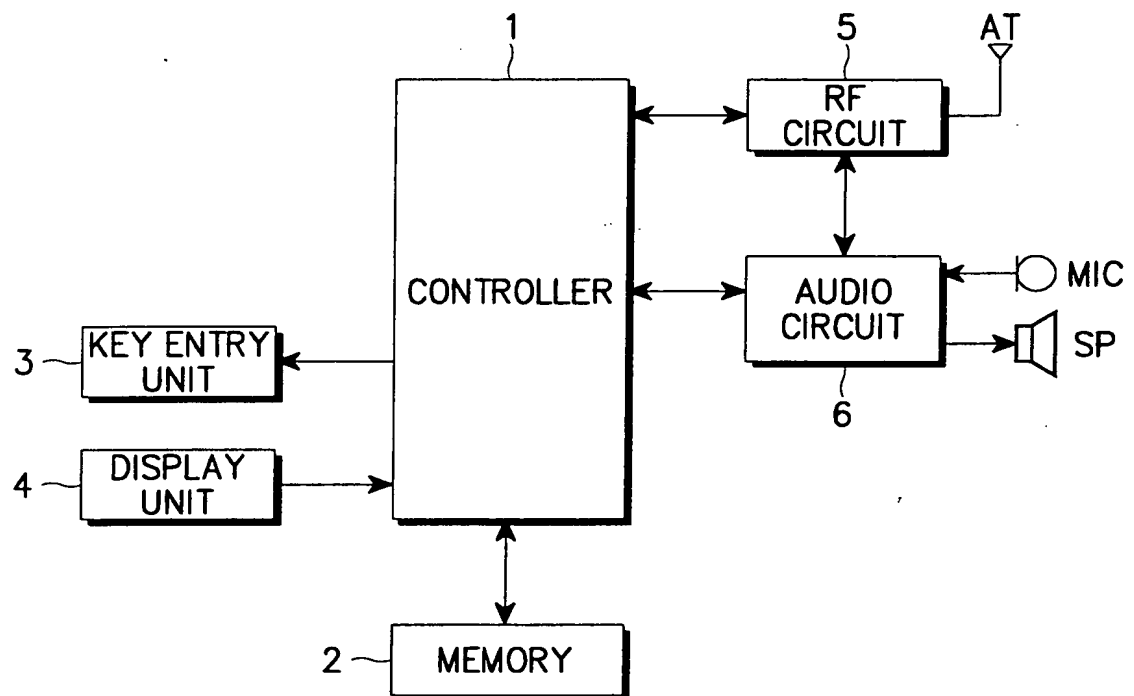


FIG. 2

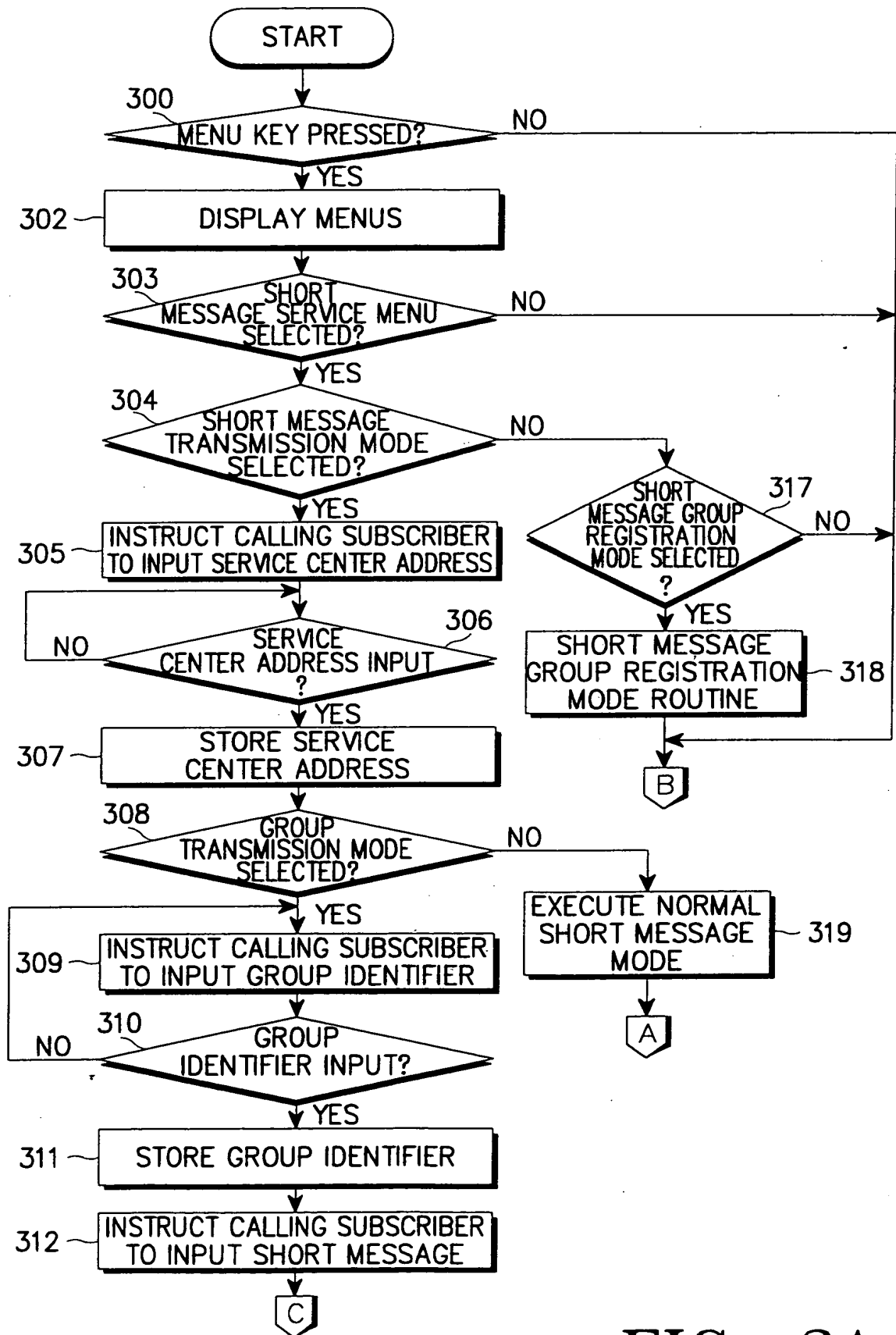


FIG. 3A

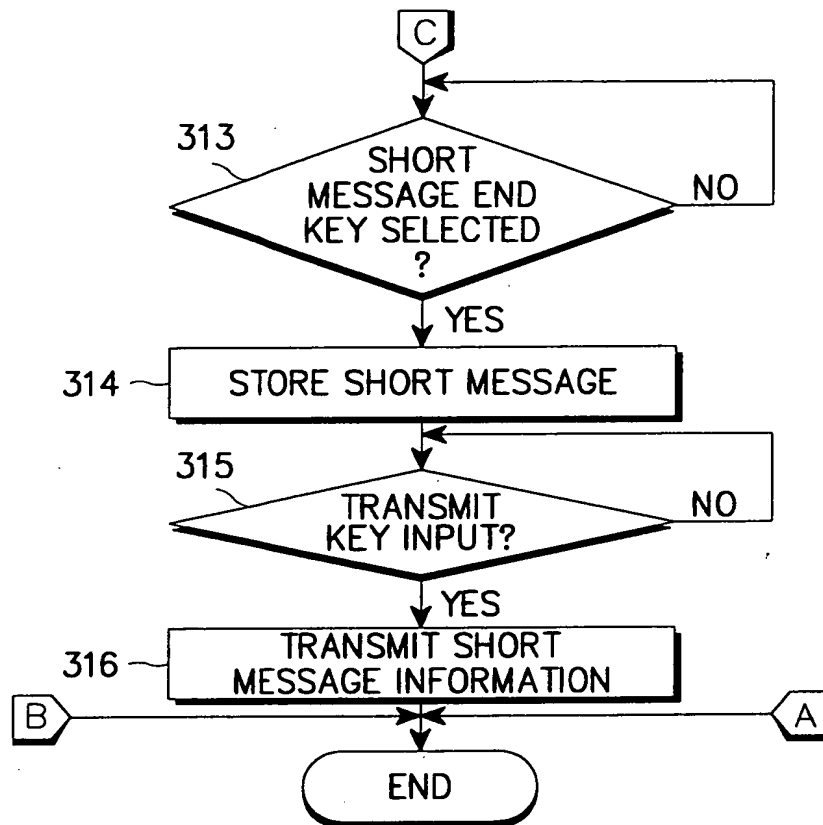


FIG. 3B

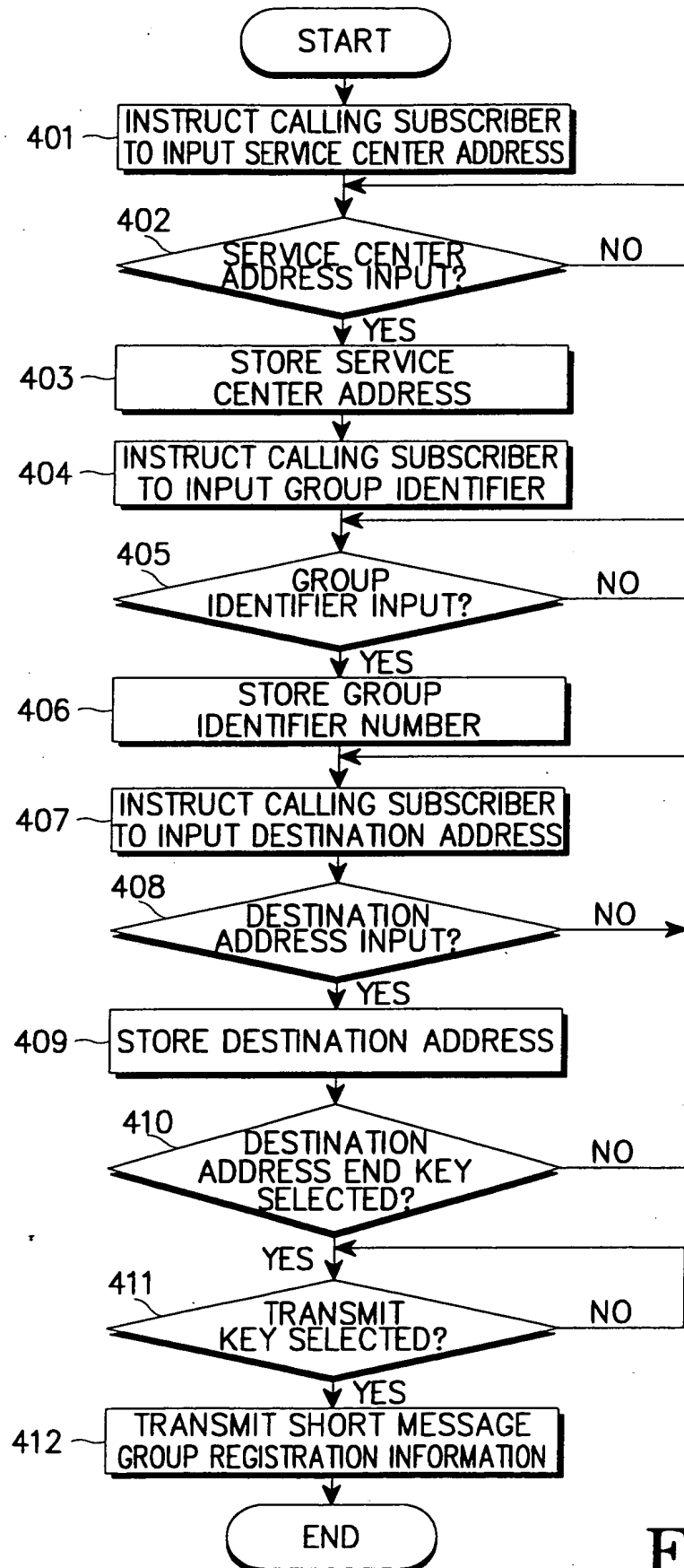


FIG. 4

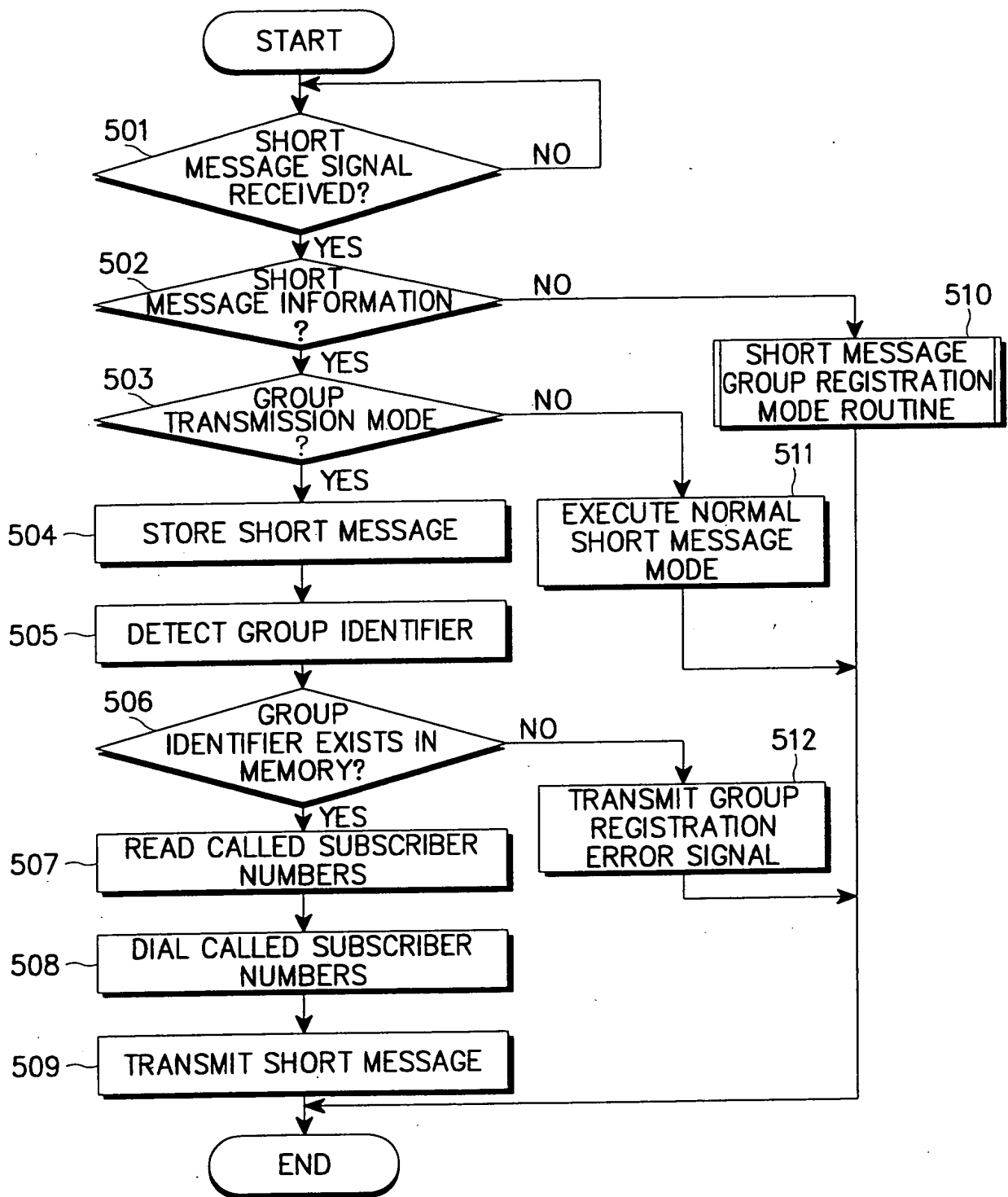


FIG. 5

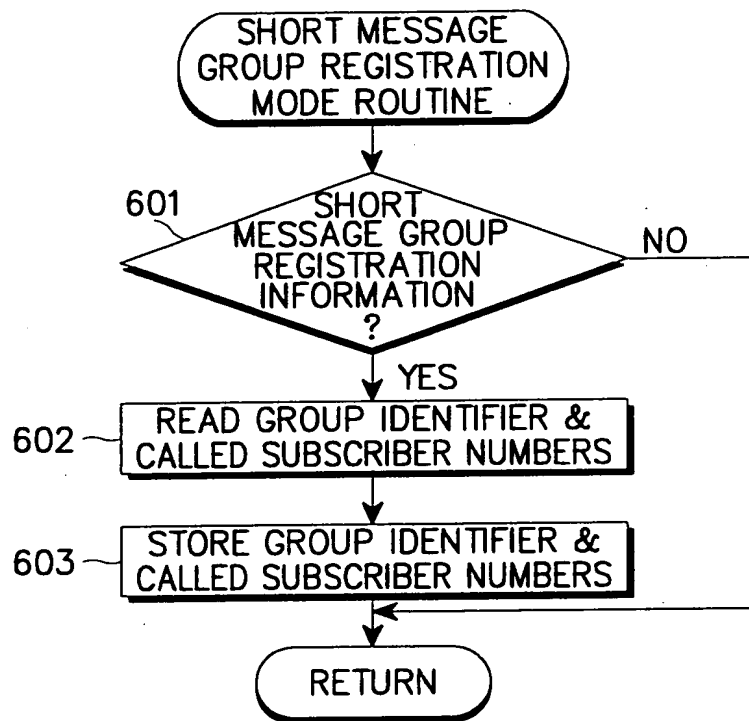


FIG. 6

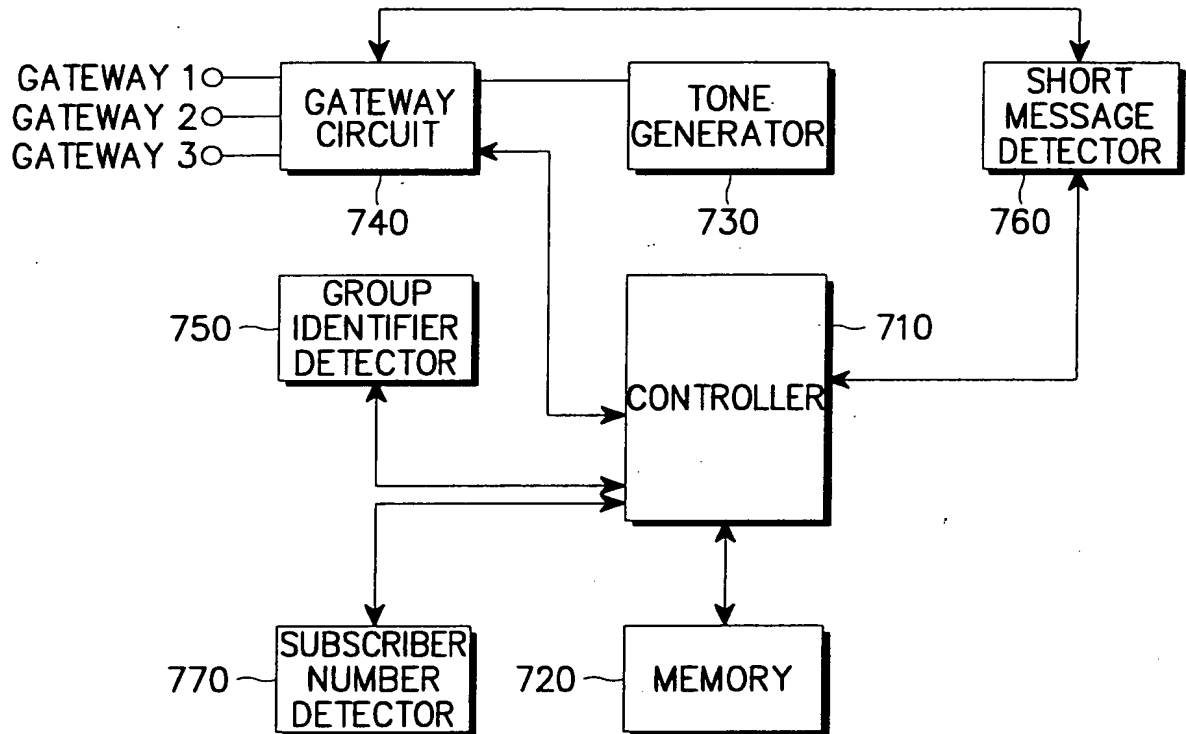


FIG. 7